

ABSTRACT

SELF ALIGNED MAGNETORESISTIVE FLUX GUIDE READ HEAD WITH EXCHANGE BIAS UNDERNEATH FREE LAYER

A magnetoresistive sensor for use in a data storage device has a recessed sensing element
5 (magnetic tunnel junction, CPP spin valve, etc.) with an exchange biased sensing ferromagnetic
(free) layer, and a flux guide that magnetically connects the sensing element to a sensing surface
of the sensor. The free layer is selectively exchange biased by a layer of exchange bias material
placed under non-active regions of the free layer that lie outside the sensing element and flux
guide track widths. The flux guide is provided by extending the free layer from a forward edge
10 of the sensing element to the sensor surface. Advantageously, the sensing element and the flux
guide have equal track width so that magnetic flux directed from the flux guide into the sensing
element is not diluted with consequent loss of sensitivity.